

RESPONSE TO OFFICE ACTION MAILED JANUARY 8, 2008  
Page 2 of 14

S/N: 10/738,431  
ATTY. DICT. NO.: 5760-13700 (VRTS0377)

RECEIVED  
CENTRAL FAX CENTER

MAR 27 2008

**IN THE CLAIMS**

1. (Previously Presented) A carrier computer-readable memory medium storing program instructions executable to implement a method comprising:  
determining an ordering for a plurality of  $N$  nodes such that the nodes are circularly ordered as nodes  $D_0, D_1, D_2, \dots, D_{N-1}$ ;  
each node  $D_i$  in the plurality of nodes establishing a link: to  $X$  other nodes chosen as nodes  $D_{i+1}, D_{i+2}, \dots, D_{i+X}$ , wrapping to  $D_0$  if necessary; and  
each node  $D_j$  in at least a subset of the plurality of nodes establishing a link with one or more additional chosen nodes not in the set  $D_{j-X}, D_{j-X+1}, \dots, D_{j-1}, D_{j+1}, D_{j+2}, \dots, D_{j+X}$ ;  
and  
for each node  $D_j$  in the at least the subset, each node in the set  $D_{j-X}, D_{j-X+1}, D_{j+1}, D_{j+2}, \dots, D_{j+X}$  establishing a link with the one or more additional nodes chosen by the node  $D_j$ .
2. (Canceled)
3. (Previously Presented) The computer-readable memory medium of claim 1,  
wherein said each node  $D_j$  in the at least the subset establishing a link: with one or more additional chosen nodes not in the set  $D_{j-X}, D_{j-X+1}, \dots, D_{j-1}, D_{j+1}, D_{j+2}, \dots, D_{j+X}$  comprises each node  $D_j$  in the at least the subset establishing a link with one or more randomly chosen nodes not in the set  $D_{j-X}, D_{j-X+1}, \dots, D_{j-1}, D_{j+1}, D_{j+2}, \dots, D_{j+X}$ .
4. (Previously Presented) The computer-readable memory medium of claim 3,  
wherein said each node  $D_j$  in the at least the subset establishing a link with one or more randomly chosen nodes comprises each node  $D_j$  in the at least the subset establishing a link with exactly one randomly chosen node.
5. (Previously Presented) The computer-readable memory medium of claim 1,  
wherein the plurality of nodes utilize the established links to communicate in a peer-to-peer manner.

#79699-1

RESPONSE TO OFFICE ACTION MAILED JANUARY 8, 2008  
Page 3 of 14

S/N: 10/738,431  
ATTY. DKT. NO.: 5760-13700 (VRTS0377)

6. (Previously Presented) The computer-readable memory medium of claim 1, wherein the nodes are circularly ordered so that node  $D_{N-1}$  follows node  $D_0$  in the ordering.
7. (Previously Presented) The computer-readable memory medium of claim 1, wherein the method implemented by the program instructions further comprises:  
selecting the nodes for the at least the subset of the plurality of nodes such that the at least the subset includes nodes whose position in the ordering is a multiple of  $2X$ .
8. (Previously Presented) The computer-readable memory medium of claim 1, wherein  $X$  is at least eighty percent smaller than  $N$ .
9. (Previously Presented) The computer-readable memory medium of claim 1, wherein each node in the plurality of nodes has a unique node ID;  
wherein said determining the ordering comprises determining an ordering based on the node IDs.
10. (Previously Presented) The computer-readable memory medium of claim 9, wherein the node IDs are capable of being ordered;  
wherein said determining the ordering based on the node IDs comprises ordering the node IDs;  
wherein the node with the first node ID in the ordering is selected as node  $D_0$ , wherein the node with the second node ID in the ordering is selected as node  $D_1$  and so on, up to the node with the highest node ID in the ordering being selected as node  $D_{N-1}$ .
11. (Previously Presented) The computer-readable memory medium of claim 1, wherein each link between two nodes comprises a virtual communication channel

#79699-1

RESPONSE TO OFFICE ACTION MAILED JANUARY 8, 2008  
Page 4 of 14

S/N: 10/738,431  
ATTY. DKT. NO.: 5760-13700 (VRTS0377)

between the two nodes.

12. (Previously Presented) The computer-readable memory medium of claim 1, wherein the established links comprise one or more TCP links and/or one or more UDP links.

13. (Previously Presented) The computer-readable memory medium of claim 1, wherein the plurality of nodes are interconnected in a local area network (LAN).

14. (Previously Presented) The computer-readable memory medium of claim 1, wherein the method implemented by the program instructions further comprises: one or more nodes in the plurality of nodes establishing one or more additional links to one or more other nodes.

15. (Previously Presented) The computer-readable memory medium of claim 1, wherein the established links enable a message to be routed from any given first node to any given second node with an average efficiency on the order of  $\log(N)$  message hops.

16. (Previously Presented) The computer-readable memory medium of claim 1, wherein the established links enable recovery operations to be performed in the event of node failures with an average efficiency on the order of 3 message hops or less.

17. (Previously Presented) A computer-readable memory medium storing program instructions executable to implement a method comprising:

determining an ordering for a plurality of  $N$  nodes such that the nodes are circularly ordered as nodes  $D_0, D_1, D_2 \dots D_{N-1}$ ;

each node  $D_i$  in the plurality of nodes establishing a link to  $X$  other nodes chosen as  $D_{i+1}, D_{i+2}, \dots D_{i+X}$ , wrapping to  $D_0$  if necessary; and

for each node  $D_j$  in at least a subset of the plurality of nodes:

the node  $D_j$  establishing a link with one or more randomly chosen nodes

#79699-1

RESPONSE TO OFFICE ACTION MAILED JANUARY 8, 2008  
Page 5 of 14

S/N: 10/738,431  
ATTY. DKT. NO.: 5760-13700 (VRTS0377)

not in the set  $D_{j-x}, D_{j-x+1}, \dots, D_{j-1}, D_{j+1}, D_{j+2}, \dots, D_{j+x}$ ;

each node in the set  $D_{j-x}, D_{j-x+1}, \dots, D_{j-1}, D_{j+1}, D_{j+2}, \dots, D_{j+x}$  establishing a link with the one or more nodes randomly chosen by the node  $D_j$ .

18. (Previously Presented) A computer-readable memory medium storing program instructions executable to implement a method of comprising:

determining an ordering for a plurality of nodes such that the ordering has a first node, a second node, and so on, up to a last node, wherein the ordering is circular so that the first node follows the last node in the ordering;

each node establishing one or more links to one or more nodes immediately following the node in the ordering; and

for each respective node of at least a subset of the plurality of nodes, the respective node establishing one or more links to one or more randomly chosen nodes and each of the one or more nodes immediately following the respective node also establishing a link to each of the one or more nodes randomly chosen by the respective node.

19. (Previously Presented) A system comprising:

a plurality of  $N$  nodes;

wherein each node is operable to determine an ordering for the plurality of  $N$  nodes such that the nodes are circularly ordered as nodes  $D_0, D_1, D_2, \dots, D_{N-1}$ ;

wherein each node  $D_i$  in the plurality of nodes is operable to establish a link to  $X$  other nodes chosen as nodes  $D_{i+1}, D_{i+2}, \dots, D_{i+X}$ , wrapping to  $D_0$  if necessary; and

wherein each node  $D_j$  in at least a subset of the plurality of nodes is operable to establish a link with one or more additional chosen nodes not in the set  $D_{j-x}, D_{j-x+1}, \dots, D_{j-1}, D_{j+1}, D_{j+2}, \dots, D_{j+x}$ ; and

wherein for each node  $D_j$  in the at least the subset, each node in the set  $D_{j-x}, D_{j-x+1}, \dots, D_{j-1}, D_{j+1}, D_{j+2}, \dots, D_{j+x}$  is operable to establish a link with the one or more additional nodes chosen by the node  $D_j$ .

20. (Canceled)

#79699-1

RESPONSE TO OFFICE ACTION MAILED JANUARY 8, 2008  
Page 6 of 14

S/N: 10/738,431  
ATTY. DKT. NO.: 5760-13700 (VRTS0377)

21. (Original) The system of claim 19,  
wherein said each node  $D_j$  in the at least the subset establishing a link with one or more additional chosen nodes not in the set  $D_{j-X}, D_{j-X+1}, \dots, D_{j-1}, D_{j+1}, D_{j+2}, \dots, D_{j+X}$  comprises each node  $D_j$  in the at least the subset establishing a link with one or more randomly chosen nodes not in the set  $D_{j-X}, D_{j-X+1}, \dots, D_{j-1}, D_{j+1}, D_{j+2}, \dots, D_{j+X}$ .
22. (Original) The system of claim 21,  
wherein said each node  $D_j$  in the at least the subset establishing a link with one or more randomly chosen nodes comprises each node  $D_j$  in the at least the subset establishing a link with exactly one randomly chosen node.
23. (Original) The system of claim 19,  
wherein the plurality of nodes are operable to utilize the established links to communicate in a peer-to-peer manner.
24. (Original) The system of claim 19,  
wherein the at least the subset includes nodes whose position in the ordering is a multiple of  $2X$ .
25. (Previously Presented) The system of claim 19,  
wherein  $X$  is at least eighty percent smaller than  $N$ .
26. (Original) The system of claim 19,  
wherein each node in the plurality of nodes has a unique node ID;  
wherein said determining the ordering comprises determining an ordering based on the node IDs.
27. (Original) The system of claim 19,  
wherein each link: between two nodes comprises a virtual communication channel between the two nodes.

#79698-1

RESPONSE TO OFFICE ACTION MAILED JANUARY 8, 2008  
Page 7 of 14

S/N: 10/738,431  
ATTY. DKT. NO.: 5760-13700 (VRTS0377)

28. (Original) The system of claim 19,  
wherein the network comprises a local area network (LAN), wherein the LAN  
interconnects the plurality of nodes.
29. (Original) The system of claim 19,  
wherein one or more nodes in the plurality of nodes are operable to establish one  
or more additional links to one or more other nodes.

#79699-1